

**NORTH CAROLINA DIVISION OF  
AIR QUALITY**

**Application Review**

**Issue Date:** **TBD**

**Region:** Washington Regional Office  
**County:** Wayne  
**NC Facility ID:** 9600017  
**Inspector's Name:** Robert Bright  
**Date of Last Inspection:** 10/30/2019  
**Compliance Code:** 3 / Compliance - inspection

<p align="center"><b>Facility Data</b></p> <p><b>Applicant (Facility's Name):</b> Duke Energy Progress, LLC - H.F. Lee Steam Electric Plant</p> <p><b>Facility Address:</b> Duke Energy Progress, LLC - H.F. Lee Steam Electric Plant 1199 Black Jack Church Road Goldsboro, NC 27530</p> <p><b>SIC:</b> 4911 / Electric Services <b>NAICS:</b> 221112 / Fossil Fuel Electric Power Generation</p> <p><b>Facility Classification: Before:</b> Title V <b>After:</b> Title V <b>Fee Classification: Before:</b> Title V <b>After:</b> Title V</p>				<p align="center"><b>Permit Applicability (this application only)</b></p> <p><b>SIP:</b> 02D: .0503, .0515, .0516, .0521, .0530, .0540 02Q: .0400, .0504, .0711 <b>NSPS:</b> 02D .0524 (Dc, GG, IIII, KKKK) <b>NESHAP:</b> 02D .1111 (YYYY, ZZZZ, DDDDD) <b>PSD:</b> Major <b>PSD Avoidance:</b> 02Q .0317 (NOx, SO<sub>2</sub>, PM/10/2.5, CO, VOC, H<sub>2</sub>SO<sub>4</sub>, Pb) <b>NC Toxics:</b> 02D .1100, .02Q .0711 <b>112(r):</b> n/a <b>Other:</b> Cross State Air Pollution Rule</p>																																																			
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<p><b>Total Actual emissions in TONS/YEAR:</b></p> <table border="1"> <thead> <tr> <th>CY</th> <th>SO<sub>2</sub></th> <th>NO<sub>x</sub></th> <th>VOC</th> <th>CO</th> <th>PM<sub>10</sub></th> <th>Total HAP</th> <th>Largest HAP</th> </tr> </thead> <tbody> <tr> <td align="center">2018</td> <td align="center">17.25</td> <td align="center">1203.89</td> <td align="center">32.57</td> <td align="center">151.05</td> <td align="center">173.90</td> <td align="center">6.28</td> <td align="center">3.91 [Formaldehyde]</td> </tr> <tr> <td align="center">2017</td> <td align="center">15.73</td> <td align="center">1095.41</td> <td align="center">16.93</td> <td align="center">73.22</td> <td align="center">163.87</td> <td align="center">4.29</td> <td align="center">2.83 [Formaldehyde]</td> </tr> <tr> <td align="center">2016</td> <td align="center">15.59</td> <td align="center">1060.46</td> <td align="center">35.69</td> <td align="center">223.78</td> <td align="center">159.34</td> <td align="center">6.30</td> <td align="center">4.25 [Formaldehyde]</td> </tr> <tr> <td align="center">2015</td> <td align="center">17.62</td> <td align="center">1156.11</td> <td align="center">25.61</td> <td align="center">271.41</td> <td align="center">158.83</td> <td align="center">5.31</td> <td align="center">3.32 [Formaldehyde]</td> </tr> <tr> <td align="center">2014</td> <td align="center">17.10</td> <td align="center">1029.78</td> <td align="center">12.85</td> <td align="center">529.22</td> <td align="center">136.88</td> <td align="center">3.54</td> <td align="center">2.15 [Formaldehyde]</td> </tr> </tbody> </table>								CY	SO <sub>2</sub>	NO <sub>x</sub>	VOC	CO	PM <sub>10</sub>	Total HAP	Largest HAP	2018	17.25	1203.89	32.57	151.05	173.90	6.28	3.91 [Formaldehyde]	2017	15.73	1095.41	16.93	73.22	163.87	4.29	2.83 [Formaldehyde]	2016	15.59	1060.46	35.69	223.78	159.34	6.30	4.25 [Formaldehyde]	2015	17.62	1156.11	25.61	271.41	158.83	5.31	3.32 [Formaldehyde]	2014	17.10	1029.78	12.85	529.22	136.88	3.54	2.15 [Formaldehyde]
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<p><b>Review Engineer:</b> Russell Braswell</p> <p><b>Review Engineer's Signature:</b> _____ <b>Date:</b> _____</p>				<p align="center"><b>Comments / Recommendations:</b></p> <p>Issue 01812/T46 <b>Permit Issue Date:</b> <b>TBD</b> <b>Permit Expiration Date:</b> <b>TBD+5 years</b></p>																																																			

## 1. Purpose of Applications:

### a. .19F

Duke Energy Progress, LLC - H.F. Lee Steam Electric Plant ("DEP"; "the facility") currently operates a power plant in Wayne County, North Carolina under Title V permit no. 01812T45 ("the existing permit"). The existing permit is set to expire on June 30, 2020. DEP submitted this application in order to renew the Title V permit as allowed by General Condition K of the existing permit. Because this application was received within six months of the expiration date, the existing permit will remain in effect, regardless of expiration date, until this application is processed.

In addition to renewing the permit, DEP requested that six natural gas-fired heaters and a diesel fuel storage tank be added to the list of insignificant activities.

### b. .19E

The existing permit for this facility also includes a Title IV acid rain permit. The expiration date of this permit is the same as the Title V permit. DEP submitted this application in order to renew the acid rain permit without modification.

## 2. Facility Description:

This facility is a power plant consisting of five simple-cycle turbines, three simple/combined-cycle turbines, a flyash beneficiation project (a.k.a. "STAR®"), and supporting activities such as fuel tanks and boilers. Natural gas and No. 2 fuel oil are the only fuels used for generating electricity. According to the most recent inspection report, this facility generates electricity for peak periods, with the peak seasons being January/February and July/August.

Based on the most recent inspection report, the STAR® facility is under construction and the first-fire is planned for Q3 2020.

## 3. Application Chronology:

- November 26, 2019 Application .19E received.
- December 5, 2019 Application .19F received.
- May 20, 2020 An initial draft of the permit and application review were sent to DAQ staff (Tom Anderson, Mark Cuilla, Samir Parekh, Betsy Huddleston, Robert Bright, Yongcheng Chen) and DEP staff (Erin Wallace). For a summary of comments received, see Attachment 1.
- June 15, 2020 DEP sent an email requesting a new diesel fuel storage tank be added to the list of insignificant activities.
- July 10, 2020 A second draft of the permit was sent to DEP staff. This draft reflected updates to the PSD Avoidance condition and CEMS requirements. For a summary of comments received, see Attachment 2.
- August 28, 2020 DEP sent a letter requesting that exhaust passing through the HRSG stack drain and weep holes be included as an insignificant activity.

• XXXX Public notice / EPA review

• XXXX Permit issued.

#### 4. Title V Permit Modifications Following the Previous Permit Renewal:

- July 15, 2015 Permit T40 issued. This action renewed the Title V and acid rain permits, removed old equipment such as the coal-fired boilers, allowed some control devices to be operated on an "as needed" basis, and made corrections to several permit conditions.
- March 3, 2016 Permit T41 issued. This action changed the name on the permit (formerly "Duke Energy Progress – H. F. Lee Steam Electric Plant").
- September 8, 2016 Permit T42 issued. This was a major modification that allowed for different emission limits during turbine tuning events.
- December 11, 2018 Permit T43 issued. This was the first step of a 2-step significant modification. This action added the STAR® flyash processing project as part of DEP's ash beneficiation plans.
- March 26, 2019 Application .19A received. This application was for a major PSD modification.
- April 11, 2019 Permit T44 issued. This action corrected the boiler MACT conditions in the permit.
- April 6, 2020 Permit T45 issued. This action was a significant modification that made changes to the STAR® emission sources on the permit.
- June 28, 2020 Application .19A withdrawn.

#### 5. Changes to the Existing Permit:

Insert Table of Changes from final permit before issuance

Page No.*	Specific Condition*	Description of Changes
Throughout	Throughout	<ul style="list-style-type: none"> <li>• Updated dates/permit numbers.</li> <li>• Fixed formatting.</li> <li>• Removed references to 15A NCAC 02D .1109.</li> <li>• Removed references to the Clean Air Interstate Rule (15A NCAC 02D .2400).</li> <li>• Removed references to firewater pump FWP1 because it has been moved to the List of Insignificant Activities.</li> </ul>
n/a	List of Insignificant Activities	<ul style="list-style-type: none"> <li>• Added the following sources at Permittee's request: I-ES-45A through C; I-ES-46A through C; I-ES-47, and I-ES-48.</li> </ul>

Page No.*	Specific Condition*	Description of Changes
		<ul style="list-style-type: none"> <li>Moved the firewater pump FWP1 to this list at Permittee's request. Noted that the engine is rated at 265 horsepower per the application for the T35 permit revision.</li> </ul>
4	List of Permitted Emission Sources	<ul style="list-style-type: none"> <li>Removed FWP1 from this list.</li> </ul>
23	2.1 D.3	<ul style="list-style-type: none"> <li>Noted date of initial notification.</li> </ul>
25	2.1 D.4	<ul style="list-style-type: none"> <li>Noted date of initial notification.</li> <li>Clarified reporting requirement (previously, the requirement did not specify the hours of operation to be an "aggregate total").</li> </ul>
28 and 32	2.1 E.5 and 2.1 F.4	<ul style="list-style-type: none"> <li>Noted date of initial notification.</li> <li>Removed references to initial compliance because the date has passed.</li> <li>Renumbered these sections to reflect removal of 02D .1109.</li> </ul>
49	2.2 B.1	<ul style="list-style-type: none"> <li>Included definition of excess emissions and CEMS downtime.</li> <li>Included CEMS data substitution requirements for PSD Avoidance: <ul style="list-style-type: none"> <li>SO<sub>2</sub> data substitution based on the maximum potential emission rate included in the 9600017.17A application and T43 application review</li> <li>CO data substitution based on highest hourly emission rates included in the 9600017.09D application and T35 application review.</li> </ul> </li> <li>The following changes are for clarity only. These changes should not impact the Permittee's compliance requirements: <ul style="list-style-type: none"> <li>Reorganized the paragraphs in this condition.</li> <li>Combined testing requirements under same heading.</li> <li>Simplified equations by removing repetitive terms.</li> </ul> </li> </ul>
57	2.4	<ul style="list-style-type: none"> <li>Replaced the Clean Air Interstate Rule with the Cross State Air Pollution Rule.</li> </ul>
58	3.	<ul style="list-style-type: none"> <li>Updated General Conditions to v5.5.</li> </ul>

\* This refers to the current permit unless otherwise stated

## 6. Regulatory Overview and Rules Review:

Under the existing permit, DEP is subject to the following State Implementation Plan ("SIP") rules:

- 15A NCAC 02D .0503 "Particulates from Fuel Burning Indirect Heat Exchangers"
- 15A NCAC 02D .0515 "Particulates from Miscellaneous Industrial Processes"
- 15A NCAC 02D .0516 "Sulfur Dioxide Emissions from Combustion Sources"
- 15A NCAC 02D .0521 "Control of Visible Emissions"
- 15A NCAC 02D .0524 "New Source Performance Standards" (40 CFR Part 60, Subparts Dc, Gg, III, and KKKK)
- 15A NCAC 02D .0530 "Prevention of Significant Deterioration"

- 15A NCAC 02D .0540 "Particulates from Fugitive Non-Process Dust Emission Sources"
- 15A NCAC 02D .1100 "Control of Toxic Air Pollutants" (State-enforceable only)
- 15A NCAC 02D .1111 "Maximum Achievable Control Technology" (40 CFR Part 63, Subparts YYYY, ZZZZ, and DDDDD)
- 15A NCAC 02Q .0317 "Avoidance Conditions"
- 15A NCAC 02Q .0400 "Acid Rain Procedures"
- 15A NCAC 02Q .0504 "Option for Obtaining Construction and Operation Permit"
- 15A NCAC 02Q .0711 "Emission Rates Requiring a Permit" (State-enforceable only)

In addition to the above SIP rules, DEP is also subject to the Cross State Air Pollution Rule. This rule is not included in North Carolina's SIP and is Federally-enforceable only. DEP's requirements under each of these rules are discussed below. In addition, a discussion of several non-applicable rules is also included below.

a. 02D .0503 "Particulates from Fuel Burning Indirect Heat Exchangers"

This rule limits particulate matter ("PM") emissions from indirect heat exchangers with no other specific PM emission limits. This rule applies to the combined-cycle turbines (only when the duct burners are operating), each boiler, and each heater at this facility.

The PM limit for this rule is a function of the total heat input of the sources subject to the rule. Based on the existing permit, the PM limits for each subject source at this facility is 0.11 pounds of PM per million Btu of heat input.

The only fuels burned in the above-mentioned sources are natural gas and No. 2 fuel oil. Based on the emission factors published in USEPA's document "Compilation of Air Emissions Factors" (a.k.a "AP-42"), these fuels are expected to comply with 02D .0503 by default. Therefore, the permit does not require any monitoring, recordkeeping, or reporting to comply with this rule. Continued compliance is expected.

b. 02D .0515 "Particulates from Miscellaneous Industrial Processes"

This rule limits PM emissions from emission sources that exhaust through a stack, vent, or outlet, and with no other specific PM emission limits. The emission limit is a function of the process rate of the subject emission source. At this facility, the emission sources associated with the STAR® process are subject to this rule.

In order to demonstrate compliance with this rule, DEP must conduct an emission test of the STAR® reactor, storage silos, external heat exchangers, and storage dome. The test is required within 90 days of startup of these sources. In addition, DEP will operate fabric filters with these sources. Based on the most recent inspection report, these sources are still under construction.

Compliance will be determined with the results of the initial emission test and subsequent inspections.

c. 02D 0516 "Sulfur Dioxide Emissions from Combustion Sources"

This rule limits sulfur dioxide ("SO<sub>2</sub>") emissions from combustion sources for which there are no other SO<sub>2</sub> emission standards. In all cases, the limit is 2.3 pounds of SO<sub>2</sub> per million Btu of heat input.

Each boiler, heater, and generator at this facility are subject to this rule. None of the turbines are subject to this rule because each is subject to an SO<sub>2</sub> standard under 02D .0524 or .0530.

The only fuels burned the above-mentioned sources are natural gas, No. 2 oil, and gasoline. Based on the emission factors found in chapters 3.2 and 3.4 of AP-42, these fuels are expected to comply with 02D .0516 by default. Therefore, no monitoring, recordkeeping, or reporting is required for DEP to demonstrate compliance with this rule for these sources.

In addition to the above-mentioned sources, the STAR® reactor is subject to this rule. The STAR® reactor burns natural gas, but is also expected to release substantial amounts of SO<sub>2</sub> due to the sulfur content of flyash fed to the reactor. In order to comply with the emission limit, DEP will operate a dry scrubber to control SO<sub>2</sub> emissions. In order to demonstrate compliance with this rule, DEP will also operate a continuous emission monitoring system ("CEMS") for SO<sub>2</sub> once the reactor begins operation. Based on the most recent inspection report, the STAR® reactor is still under construction.

d. 02D 0521 "Control of Visible Emissions"

This rule limits the opacity of non-fugitive visible emissions ("VE") from emission sources that do not have a specific VE limit under other 02D .0500 rules. For sources constructed after 1971 (i.e. each source at this facility), the rule limits opacity in most cases to 20%. Each turbine, boiler, heater, generator, and source part of the STAR® process is subject to this rule.

In general, emergency-use generators, heaters, and small boilers are not expected to produce VE under normal operations. Therefore, the permit does not require any specific monitoring, recordkeeping, or reporting for VE from such sources.

In general, burning natural gas in a combustion turbine is not expected to produce VE in excess of 20% under normal operations. To address the possibility of VE from the turbines while burning fuel oil, DEP is required to perform a Method 9 test for VE after operating for 1,100 hours on fuel oil. An additional test is required for each subsequent 1,100 hours of operation. DEP is required to keep records of VE tests and report them twice per year.

Once the STAR® process and associated sources are operating, DEP will be required to perform periodic monitoring of these sources for VE.

Based on the most recent inspection report, DEP appears to be in compliance with this rule. Continued compliance will be determined with subsequent inspections and reports.

e. 02D .0524 "New Source Performance Standards" ("NSPS"; 40 CFR Part 60)

This rule incorporates the NSPS rules into North Carolina's SIP (excluding those rules listed in 02D .0524(b)). NSPS Subparts Dc, GG, IIII, and KKKK apply to sources at this facility.

1. Subpart Dc "Small Industrial-Commercial-Institutional Steam Generating Units"

Subpart Dc applies to all boilers constructed after 1989 with a heat input greater than 10 million Btu per hour. The only such boiler at this facility is AB-1. Note that §60.40c(e) specifically exempts heat recovery steam generators ("HRSG") that are associated with turbines subject to NSPS Subpart KKKK. Therefore, the HRSG associated with Units 1A, 1B, and 1C is not subject to this rule.

For natural gas-fired boilers with a heat input less than 30 million Btu per hour, the only requirement under this rule is to keep monthly records of fuel use. No reporting is required.

Based on the most recent inspection report, DEP appears to be in compliance with this rule. Continued compliance with this rule will be determined with subsequent inspections.

## 2. Subpart GG "Stationary Gas Turbines"

This rule applies to stationary gas turbines constructed after October 3, 1977 but that are also not subject to NSPS Subpart KKKK. The turbines Units 10, 11, 12, and 13 are subject to this rule.

In general, the rule requires that turbines comply with emission standards for nitrogen oxides ("NO<sub>x</sub>") and SO<sub>2</sub>.

In order to demonstrate compliance with the NO<sub>x</sub> limit, DEP must continuously monitor NO<sub>x</sub> emissions using either a CEMS or a continuous monitor of air-to-fuel ratio and steam injection. Based on DAQ's inspection report from November 8, 2019, DEP uses the CEMS option on Units 12 and 13 and the non-CEMS option on Units 10 and 11.

In order to demonstrate compliance with the SO<sub>2</sub> limit, DEP must monitor the sulfur content of the fuel burned in each subject turbine.

DEP must keep records of CEMS operation, fuel and steam input monitoring, and sulfur content monitoring. Reports of the recordkeeping activities must be submitted twice per year.

Based on the most recent inspection, DEP appears to be in compliance with this rule. Continued compliance will be determined with subsequent inspections and reports.

## 3. Subpart IIII "Stationary Compression Ignition Internal Combustion Engines"

This rule applies to stationary compression ignition engines installed after April 1, 2006. The firewater pump FWP1 and the engines associated with the ash basin, screeners, and crushers are subject to this rule.

Each engine at this facility is considered "insignificant" per 15A NCAC 02Q .0503(8). The Title V permit does not contain specific conditions for such sources. DEP must still comply with this rule for these sources.

The firewater pump is considered an emergency-use engine under this rule. In general, this rule requires that emergency-use engines:

- Combust low-sulfur fuel;
- Operate according to manufacturer specifications;
- Operate during periods of emergency, maintenance, or as allowed by §60.4211(f); and
- Install a non-resettable hour meter.

The facility must keep records of maintenance and the hours of operation of emergency and nonemergency use. All recordkeeping must be reported twice per year.

Based on the most recent inspection report, DEP is in compliance with this rule. Continued compliance will be determined during subsequent inspections.

4. Subpart KKKK "Stationary Combustion Turbines"

This rule applies to stationary gas turbines constructed, modified, or reconstructed after February 18, 2005. Units 1A, 1B, and 1C are subject to this rule. All other turbines at this facility were constructed before this date and have not been modified/reconstructed after this date.

In general, this rule limits emissions of nitrogen oxides ("NO<sub>x</sub>") and sulfur dioxide ("SO<sub>2</sub>") based on the type of fuel being fired. Use of the duct burner is only allowed when firing natural gas. In order to demonstrate compliance with the emission limits, DEP operates a NO<sub>x</sub> CEMS and monitors the sulfur content of fuel fired in the turbines. DEP must submit a report of monitoring activities twice per year.

Based on the most recent inspection report, DEP appears to be in compliance with this rule. Continued compliance will be determined with subsequent inspections and reports.

f. 02D .0530 "Prevention of Significant Deterioration" ("PSD"; 40 CFR Parts 51 and 70)

This facility is considered a Major Source for PSD and has undergone multiple major modifications for PSD. As a result, the permit includes Best Available Control Technology ("BACT") short-term and long-term emission limits for several sources. The table below summarizes the BACT requirements and when they were included in the permit.

Emission Sources	Pollutants	Requirements	Notes
Units 10 through 13	NO <sub>x</sub> , SO <sub>2</sub> , CO, VOC, PM <sub>10</sub> , H <sub>2</sub> SO <sub>4</sub>	<ul style="list-style-type: none"> <li>• Short-term emission standards based on fuel and firing type;</li> <li>• Annual emission limits;</li> <li>• Limit sulfur and nitrogen content of fuel oil;</li> <li>• Monitor NO<sub>x</sub> with CEMS or as allowed under Appendix E to 40 CFR Part 75;</li> <li>• Less than 2,000 hours of full-load equivalent operation per turbine per calendar year; and</li> <li>• Quarterly reporting.</li> </ul>	<ul style="list-style-type: none"> <li>• Included in the Title V permit as of the T24 revision (issued December 1, 2000), which is the beginning of DAQ's electronic record of this permit.</li> <li>• Revision T40 (issued July 15, 2015) allowed for "Mode 6 DLN" to be considered for startup/shutdown times.</li> <li>• Revision T42 (issued September 8, 2016) allowed for different emission limits during turbine tuning.</li> </ul>
Fixed-roof oil storage tanks	VOC	<ul style="list-style-type: none"> <li>• Limit total throughput to 117,500,000 gallons per calendar year; and</li> <li>• Keep records of fuel use in each turbine.</li> </ul>	<ul style="list-style-type: none"> <li>• Included in the Title V permit as of the T24 revision.</li> </ul>



Emission Sources	Pollutants	Requirements	Notes
Unit 14	NO <sub>x</sub> , SO <sub>2</sub> , PM10, H <sub>2</sub> SO <sub>4</sub>	<ul style="list-style-type: none"> <li>• Short-term emission standards based on fuel and firing type;</li> <li>• Annual emission limits;</li> <li>• Limit sulfur content of fuel oil;</li> <li>• Use water injection while firing No. 2 oil;</li> <li>• Can only burn No. 2 oil during summer months when at least three other turbines are burning natural gas;</li> <li>• Monitor NO<sub>x</sub> with CEMS</li> <li>• Less than 2,000 hours of full-load equivalent operation per turbine per calendar year; and</li> <li>• Reporting twice per year.</li> </ul>	<ul style="list-style-type: none"> <li>• First included in the Title V permit as of the T30 revision (issued October 30, 2006).</li> <li>• Revision T40 allowed for "Mode 6 DLN" to be considered for startup/shutdown times.</li> <li>• Revision T42 allowed for different emission limits during turbine tuning.</li> </ul>

Based on the most recent inspection report, DEP appears to be in compliance with this rule. Continued Compliance will be determined with subsequent inspections and reports.

DEP submitted an application for a PSD Major Modification on March 26, 2019 (application .19A). However, DEP withdrew that application on June 28, 2020.

g. 02D .0540 "Particulates from Fugitive Non-Process Dust Emission Sources"

This rule requires facilities to control fugitive dust emissions. The rule requires facilities to not cause or contribute to substantive dust complaints. In the event of substantive complaints, DAQ may choose to require DEP to develop a fugitive dust control plan (the rule specifies the minimum requirements for such a plan).

This facility is not associated with any substantive dust complaints and DEP has not been required to develop a fugitive dust control plan.

The most recent inspection report did not note any excessive fugitive dust emissions. Continued compliance will be determined with subsequent inspections.

h. 02D .1100 "Control of Toxic Air Pollutants" (State-enforceable only)

This rule requires that facilities that emit toxic air pollutants ("TAPs") at rates higher than the thresholds listed in 02Q .0711 demonstrate compliance with the acceptable ambient limits ("AALs") in 02D .1104. Generally, compliance is demonstrated using air dispersion modeling.

This facility has used modeling to demonstrate compliance with several AALs. The most recent modeling demonstration was approved March 2, 2020. The modeling showed that arsenic would have the highest impact compared to the AAL (8.58E-04 µg/m<sup>3</sup> modeled, 2.10E-03 µg/m<sup>3</sup> allowable, 41% of the AAL). Based on the modeling demonstration, it was determined that no additional monitoring, recordkeeping, or reporting is required for this facility to demonstrate compliance with the AALs.

The addition of the insignificant natural gas-fired heaters will cause a small increase in emissions of TAPs. Each heater is subject to MACT Subpart DDDDD (discussed in Section 6.i.3) and are therefore exempt from TAP emission requirements per 02Q .0702(a)(27)(B). Potential emissions from these heaters are calculated in Section 7.a. The small increase in TAP emissions, when compared to the wide margin of compliance shown by the approved modeling demonstration mentioned above, shows that TAP emissions from these heaters will not pose an unacceptable risk to human health. Therefore, no new modeling demonstration will be required for these heaters.

i. 02D .1111 "Maximum Achievable Control Technology" ("MACT"; 40 CFR Part 63)

This rule incorporates the MACT rules into North Carolina's SIP. For the purposes of MACT applicability, this facility is a Major Source of hazardous air pollutants. Rules that apply to Area Sources (e.g. Subpart JJJJJ) do not apply to this facility by default.

There are three MACT rules that apply to this facility: Subparts YYYY, ZZZZ, and DDDDD.

1. Subpart YYYY "Stationary Combustion Turbines"

This rule applies to combustion turbines located at Major Sources. The rule specifies several subcategories of combustion turbines. The requirements of this rule differ based on the subcategory.

*Existing turbines:* §63.6090(b)(4) states that existing turbines do not have to meet the requirements of this rule. "Existing" means commenced construction or reconstruction on or before January 14, 2003. Each turbine at this facility, except Units 1A, 1B, and 1C, meet the definition of "existing" and therefore do not have to meet the requirements of this rule.

*Duct burners:* §63.6092 states that duct burners are not part of this rule. The HRSG associated with Units 1A, 1B, and 1C is heated by a duct burner. Therefore, the HRSG is not subject to this rule.

*New turbines:* Units 1A, 1B, and 1C are considered "new" and "lean premix gas-fired stationary combustion turbines" under this rule. §63.6095(d) states that such sources need only comply with the initial notification requirement of this rule. The other requirements of this rule are stayed until US EPA takes final action to require compliance and publishes a document in the Federal Register. §63.6175 states that, in order to be considered part of this category, the aggregate total time each turbine at this facility (regardless of applicability to this rule) fires fuel oil must be less than 1,000 hours per year. The existing permit requires DEP to keep a record of the total aggregate time of fuel oil burning at the facility in order to confirm Units 1A, 1B, and 1C are part of this category.

Based on the most recent inspection report, DEP appears to be in compliance with this rule. Continued compliance will be determined based on subsequent inspections.

2. Subpart ZZZZ "Stationary Reciprocating Internal Combustion Engines"

This rule applies to all stationary engines. The firewater pump IFWP1 and the engines associated with the ash basin, screeners, and crushers are subject to this rule.

Each of the engines are considered "insignificant" per 15A NCAC 02Q .0503(8). Each of the insignificant engines are subject to NSPS Subpart IIII. Per §63.6590(c), such engines must demonstrate compliance with this rule by demonstrating compliance with the applicable NSPS. The Title V permit does not contain specific conditions for such sources. DEP must still comply with this rule for these sources.

Based on the most recent inspection report, DEP appears to be in compliance with this rule. Continued compliance will be determined with subsequent inspections.

3. Subpart DDDDD "Industrial, Commercial, and Institutional Boilers and Process Heaters"

This rule applies to boilers and process heaters at major sources. The auxiliary boiler, dew point heaters, and insignificant natural gas-fired heaters are subject to this rule. Note that the HRSG associated with Units 1A, 1B, and 1C is not subject to this rule. In the rule's definition of "boiler" (per §63.7575), a "waste heat boiler" is specifically excluded from applicability. When defining a waste heat boiler, the rule states that "waste heat boilers are also referred to as heat recovery steam generators."

The requirements of this rule vary based on the age, size, and fuel type of the subject source. Each subject source at this facility is a new natural gas-fired unit with a heat input capacity either greater or less than 10 million Btu per hour.

In general, the requirements for such sources are:

- Conduct an initial tune-up;
- Conduct subsequent tune-ups (annually for greater than 10 million Btu per hour; every five years otherwise);
- Operate with good work practices;
- Keep records of maintenance and tune-ups; and
- Submit reports (annually for greater than 10 million Btu per hour; every five years otherwise)

Based on the most recent inspection report, DEP appears to be in compliance with this rule. Continued Compliance will be determined with subsequent inspections and reports.

j. 02Q .0317 "Avoidance Conditions"

DEP has accepted enforceable emission limits in order to avoid additional requirements under 02D .0530 (i.e. PSD Avoidance). The limits apply to turbine Units 1A, 1B, and 1C, and the STAR® reactor and associated emission sources.

The PSD avoidance limit was first included in the permit with the T35 revision (issued August 11, 2010). The condition was updated with the T43 revision to include the STAR® reactor and associated heat exchangers, and updated again with the T45 revision in order to make minor corrections and updates to the condition.

Pollutant	Source	Compliance method
NO <sub>x</sub>	Units 1A, 1B, and 1C	CEMS
	Other sources	Pre-determined emission factors
SO <sub>2</sub>	Units 1A, 1B, and 1C	Pre-determined emission factors
	STAR® reactor	CEMS
	Other sources	Pre-determined emission factors
PM/PM10/PM2.5	All sources	Pre-determined emission factors

Pollutant	Source	Compliance method
CO	Units 1A, 1B, and 1C	CEMS
	STAR® reactor	Emission factor to be determined by stack testing
	Other sources	Pre-determined emission factors
VOC	Units 1A, 1B, and 1C	Pre-determined emission factors
	STAR® reactor	Emission factor to be determined by stack testing
	Other sources	Pre-determined emission factors
H <sub>2</sub> SO <sub>4</sub>	All sources	Pre-determined emission factors
Lead	All sources	Compliance assumed by default

DEP must perform emission testing in order to establish VOC and CO emission factors for the STAR® reactor. The testing is due within 90 days of the initial startup of the reactor. In addition, DEP must keep records of emission monitoring and submit summary reports twice per year.

In the existing permit, data gathered by the NO<sub>x</sub> CEMS is subject to the data substitution requirements of 40 CFR Part 75, Subpart D. However, the existing permit does not specify any data substitution procedures for data from the SO<sub>2</sub> or CO CEMS. As a result, the existing permit compares substituted NO<sub>x</sub> emission data to the emission limit, but does not compare substituted data for SO<sub>2</sub> or CO. In order to ensure consistency, the permit will be updated to require substituted data for SO<sub>2</sub> and CO for the purpose of demonstrating compliance with the PSD avoidance limits.

The new permit will include the following changes:

- CEMS downtime for the NO<sub>x</sub>, SO<sub>2</sub>, and CO CEMS will be defined and limited to 5% per calendar quarter.
- SO<sub>2</sub> CEMS data will require substituting 22.42 pounds per hour<sup>1</sup> for any hour that data is not available.<sup>2</sup>
- CO CEMS data will require substituting the following values:<sup>3</sup>

Operating Mode:	Combined-Cycle Operation		Simple-Cycle Operation	
Fuel:	Natural Gas	Fuel Oil	Natural Gas	Fuel Oil
Emission rate (pounds per hour):	61.94	38.60	30	112

Based on the most recent inspection report, DEP appears to be in compliance with this rule. Continued compliance will be determined with subsequent inspections and reports.

<sup>1</sup> This value represents the maximum hourly emission rate from the STAR® reactor. This value was taken from the application review for the T43 permit revision (issued December 11, 2018), page 13.

<sup>2</sup> Note that although 40 CFR Part 75 includes a procedure for data substitution for SO<sub>2</sub> CEMS, this particular SO<sub>2</sub> CEMS is not required under Part 75. Therefore, this alternative data substitution method is used.

<sup>3</sup> These values represent the maximum potential hourly emissions of CO from one the three combined-cycle turbines. These values were taken from the application review for the T35 permit revision (issued August 11, 2011), page 5.

k. 02Q .0400 "Acid Rain Procedures"

This rule incorporates the acid rain program (40 CFR Part 72) into North Carolina's SIP.

The specific requirements for the acid rain program are included in the Phase II permit application submitted by DEP. The Phase II permit application is included in the Title V permit as an attachment.

In general, compliance with the acid rain program is determined by USEPA, not DAQ. Continued compliance will be determined by US EPA.

l. 02Q .0504 "Option for Obtaining Construction and Operation Permit"

This rule covers how a facility can apply for a 2-part significant modification. The existing permit includes a specific condition for this rule because DEP added the STAR® sources using this process. This condition was first included in the permit with the T43 revision. The condition requires DEP to submit a new permit application within 12 months of the beginning of operation of any of the STAR® sources.

Based on the most recent inspection report, the STAR® sources are still under construction. Compliance with this specific condition will be determined with subsequent inspections and when the required application is received.

m. 02Q .0711 "Emission Rates Requiring a Permit" (State-enforceable only)

This rule allows facilities that emit TAPs to avoid performing air dispersion modeling if the facility-wide emission rate is less than the toxic permit emission rates ("TPERs") listed in 02Q .0711. When DEP submitted the most recent air dispersion modeling (discussed in Section 6.h), it was determined that the facility will emit several TAPs at rates less than their TPERs. DEP must keep records of TAP emissions for comparison with the TPERs, but no additional monitoring or reporting is required.

As discussed in Section 6.h, the addition of the six natural gas-fired heaters will not affect DEP's requirements with respect to TAP rules.

Based on the most recent inspection report, DEP appeared to be in compliance with this rule. Continued compliance will be determined during subsequent inspections.

n. Cross State Air Pollution Rule ("CSAPR"; 40 CFR Part 97, Subparts AAAAA, BBBB, and CCCCC; Federally-enforceable only)

This group of rules applies to fossil-fuel-fired combustion sources that 1) produce electricity for sale, and 2) have a generator capacity greater than 25 megawatts. Each combustion turbine at this facility is subject to CSAPR.

CSAPR limits NO<sub>x</sub> and SO<sub>2</sub> emissions. Compliance with CSAPR is determined by USEPA, not DAQ. The Title V permit contains a reference to CSAPR, but no specific compliance requirements.

o. Nonapplicable Rules:

There are several SIP and Federal rules that could potentially apply at this renewal, but ultimately do not.

1. 40 CFR Part 60, Subpart CCCC "Commercial and Industrial Solid Waste Incineration Units"

This rule applies to units that meet the definition of a new commercial and industrial solid waste incineration unit. The STAR® reactor could potentially be subject to this rule because it will burn flyash. However, DAQ has previously determined that the STAR® reactor will not be subject to this rule:

"The DAQ has determined that the coal ash received directly from the coal-fired power plant's particulate collection infrastructure (i.e., electrostatic precipitator or baghouse) is a [non-hazardous secondary material] and an "ingredient", as defined in §241.2. DAQ has further determined that this flyash meets the legitimacy criteria included in §241.3(d)(2) and thus, concludes that it is not a solid waste. Therefore, the STAR Reactor is not subject to the requirements in [40 CFR Part 60, Subpart CCCC]."<sup>4</sup>

Therefore, this rule does not apply.

2. 40 CFR Part 60, Subpart TTTT "Greenhouse Gas Emissions for Electric Generating Units"

Per §60.5509(a), this rule applies to electric generating units (such as combustion turbines powering generators) that were constructed or reconstructed after June 18, 2014. Each turbine at this facility was constructed before this date, and have not been reconstructed after this date. Therefore, this rule does not apply to this facility.

3. 40 CFR Part 63, Subpart EEE "Hazardous Waste Combustors"

This rule applies to all hazardous waste combustors. The STAR® reactor could potentially be subject to this rule because it will burn flyash. However, DAQ has previously determined that flyash is not a hazardous waste:

"Moreover, coal flyash is not regulated as a hazardous waste as per Part 261 of 40 CFR "Identification and Listing of Hazardous Waste". In fact, EPA has promulgated a rule on April 17, 2015 (80 FR 21302) to regulate disposal of coal combustion residues (fly ash bottom ash, boiler slag, and flue gas desulfurization materials generated from burning coal for the purpose of generating electricity by electric utilities and independent power producers) as solid waste under Subtitle D "State or Regional Solid Waste Plans" of the Resource Conservation Act ("RCRA") (administrative regulations included in 40 CFR 257) and not under the Subtitle C of the RCRA "Hazardous Waste Management" (administrative regulations included in 40 CFR 261)."<sup>5</sup>

Because flyash is not a hazardous waste, the STAR® reactor is not a hazardous waste combustor, and this rule does not apply.

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<sup>4</sup> Attachment to the application review for the T43 permit revision (issued December 11, 2018), page 1.

<sup>5</sup> Ibid, page 3.

4. 40 CFR Part 63, Subpart UUUUU "Coal- and Oil-Fired Electric Utility Steam Generating Units"

This rule applies to electric generating units ("EGUs") that generate electricity from steam. The HRSG portion of Units 1A, 1B, and 1C could potentially be subject to this rule.

Per §63.9983(b), this rule specifically excludes natural gas-fired EGUs. While Units 1A, 1B, and 1C can burn oil, the HRSG can only burn natural gas. In addition, per §63.9983(a), the rule excludes any unit that is also subject to MACT Subpart YYYY. Units 1A, 1B, and 1C are subject to Subpart YYYY (discussed in Section 6.i.1). Therefore, the HRSG is not subject to this rule.

5. 02D .0614 "Compliance Assurance Monitoring" ("CAM"; 40 CFR Part 64)

This rule incorporates the requirements of 40 CFR Part 64 into North Carolina's SIP. CAM applies to individual emission sources based on the following criteria:

- The source is equipped with a control device,
- The source being controlled is subject to a non-exempt emission standard (defined by 02D .0614(b)(1)),
- The control device is being used to comply with the emission standard, and
- The source being controlled has potential emissions of the pollutant subject to the emission standard greater than major source thresholds.

The table below compares each control device at this facility to the above criteria:

Control Device	Associated Emission Sources	Emission Limit / Rule	Triggers CAM?	Notes
Selective catalytic reduction and oxidation catalyst; controlling NO <sub>x</sub> and CO	IC Unit No. 1A – 1C	02D .0524 (NSPS Subpart KKKK)	No	The use of a CEMS for NO <sub>x</sub> (as required for NSPS Subpart KKKK, discussed in Section 6.e.4) constitutes a continuous compliance determination method under 02D .0614(b)(1)(F).
		02Q .0317 (PSD Avoidance, NO <sub>x</sub> )	No	
		02Q .0400 (Acid Rain Permit)	No	
		40 CFR Part 97 (CSAPR)	No	
		02Q .0317 (PSD Avoidance, CO)	No	The annual CO emission limit under 02Q .0317 constitutes an emissions cap under 02D .0614(b)(1)(E).
Fabric filters; controlling PM	STAR® process	02D .0515	No	No individual source in the STAR® process has potential PM emissions greater than the major source threshold for PM.
		02Q .0317 (PSD Avoidance)	No	

Control Device	Associated Emission Sources	Emission Limit / Rule	Triggers CAM?	Notes
Dry scrubber; controlling SO <sub>2</sub>		02D .0516	No	The use of a CEMS for SO <sub>2</sub> (as required for PSD Avoidance, discussed in Section 6.j) constitutes a continuous compliance determination method.
		02Q .0317 (PSD Avoidance)	No	

No control device triggers CAM. Therefore, CAM does not apply to this facility.

6. 02D .0900 "Volatile Organic Compounds" and 02D .1400 "Nitrogen Oxides" (a.k.a. "RACT")

Per 02D .0902(f) and 02D .1402(c) and (d), the RACT rules generally apply to locations designated as nonattainment for ozone. Wayne County is not such an area, and therefore no RACT rules apply.

7. 02D .1109 "112(j) Case-by-Case Maximum Achievable Control Technology" ("CBCM")

DAQ developed a CBCM for boilers and process heaters in response to MACT Subpart DDDDD being vacated by court order. US EPA has since re-promulgated MACT Subpart DDDDD, removing the need for a CBCM.

The existing permit includes specific conditions for MACT Subpart DDDDD where necessary. It is no longer necessary that the Title V permit include references to the CBCM. All such references have been removed from the permit.

8. 02D .2100 "Risk Management Program" (a.k.a. "§112(r)", "Section 112(r) of the Clean Air Act")

This facility does not appear to store any materials above their respective thresholds in 40 CFR 68.130. Therefore, this facility is not required to submit a Risk Management Plan and has no specific requirements under 02D .2100. Note that other requirements under §112(r) (such as the General Duty Clause) may apply to this facility.

## 7. Emissions Review

a. Six natural gas-fired heaters (I-ES-45A through C and I-EF-46A through C)

The application for permit renewal requested that six natural gas-fired heaters be added to the list of insignificant activities. Each heater qualifies as insignificant per 02Q .0503(8). The heaters have a combined heat input of 28.5 million Btu per hour. These sources were already present at the facility, but had been operated by Piedmont Natural Gas. Now that DEP has acquired that company, these heaters need to be included in emission totals at this facility. The potential emissions from these heaters are calculated below.



Pollutant	Emission Factor** (lb/MMscf)	Potential Emissions		Notes
		(ton/yr)	(lb/hr)	
SO <sub>2</sub>	0.6	0.07	0.02	* 100% of PM is PM10 and PM2.5
NO <sub>x</sub>	100	12.24	2.79	** Factors from AP-42 Chapter 1.4
VOC	5.5	0.67		*** Highest individual HAP
CO	84	10.28		
PM*	7.6	0.93	0.21	
arsenic	2.00E-04	2.45E-05		
hexane***	1.80	0.22		
Total HAP	1.89	0.23		

  

Constants	
Natural gas HHV	1,020 Btu/scf
Total heater cap.	28.5 MMBtu/hr
Conversions	8,760 hr/yr
	2,000 lb/ton

b. HRSG exhaust drain and weep holes (I-ES-48)

DEP submitted a letter on August 28, 2020 requesting that a new insignificant activity be added for the HRSG exhaust drain and economizer weep holes. According to the letter, these have historically been closed while the HRSG is in operation, but this has led to corrosion and leaks within the HRSG. DEP proposes to operate the HRSG with these open. Doing so will allow a small amount of exhaust to escape via these openings.

The exhaust passing through the HRSG has already passed through all control devices associated with the HRSG. This change will only re-route a small amount of treated exhaust, and will not increase the amount of exhaust generated or change the concentration of pollutants within the exhaust. Therefore, the addition of I-ES-48 will not change emissions from this facility.

## 8. Compliance Status and Other Regulatory Concerns:

- This facility was most recently inspected on October 30, 2019 by Robert Bright. DEP appeared to be in compliance with the Title V permit during that inspection.
- There have been no Notices of Violation issued to this facility since the previous Title V permit renewal.
- Some permit applications require the facility to submit a zoning consistency determination, an application fee, and/or a Professional Engineer's seal. However, none of these are required for Title V or Title IV permit renewals.

## 9. Public Notice and EPA Review

A notice of the DRAFT Title V Permit shall be made pursuant to 15A NCAC 02Q .0521. The notice will provide for a 30-day comment period, with an opportunity for a public hearing. Consistent with 15A NCAC 02Q .0525, the EPA will have a concurrent 45-day review period. Copies of the public notice shall be sent to persons on the Title V mailing list and EPA. Pursuant to 15A NCAC 02Q .0522, a copy of each permit application, each proposed permit and each final permit shall be provided to EPA. Also, pursuant to 02Q .0522, a notice of the DRAFT Title V Permit shall be provided to each affected State at or before the time notice is provided to the public under 02Q .0521 above.

## **10. Recommendations**

Issue permit 01812T46.

DRAFT

Attachment 1 to Review of Applications 9600017.19E & .19F  
Duke Energy Progress, LLC - H.F. Lee Steam Electric Plant

**Summary of Comments on Initial Draft of Permit 01812T46**

An initial draft of the Title V permit and this application review were sent to DEP and DAQ staff on May 20, 2020. Below is a summary of responses received to this draft:

- Samir Parekh, by email on June 11, 2020

1. The draft permit does not include a definition of monitor downtime and excess emissions for the CO CEMS required by Section 2.2 B.1.e. The permit should include these definitions and a reporting requirement regarding the CO CEMS.

*Response: The permit will now define excess emissions and monitor downtime for the CEMS with regards to PSD Avoidance and require reporting of these events. Monitor downtime will be limited to 5% per quarter.*

2. In order to demonstrate compliance with Section 2.2 B.1, the draft permit requires data substitution for the NO<sub>x</sub> CEMS, but does not require data substitution for the CO CEMS. This condition should choose one method or the other.

*Response: After further review, I agree that the permit condition for PSD Avoidance should be consistent with regards to data substitution, and that substituted data should be included when determining compliance with the annual PSD Avoidance limits.*

*I have made the following general changes to the PSD Avoidance condition: (1) SO<sub>2</sub> CEMS data will require the data substitution procedures in 40 CFR Part 75, Subpart D, and (2) CO CEMS data will require data substitution using the highest applicable emission rates included in the T35 application review.*

- Mark Cuilla, by email on June 12, 2020

1. The email pointed out typos throughout the draft permit and draft review.

*Response: I have corrected the indicated issues.*

2. Some of the reporting in this permit is quarterly and some is semiannual. Could all reporting be reduced to semiannual?

*Response: After further discussion, we determined that such a change would be a significant modification. While potentially possible, DEP has not requested this change. Given that there has been no request from the applicant, I see no need to change reporting frequency at this time.*

3. The permit cross references the requirements of Turbine 14 in a section dedicated to Turbines 10-13, and vice versa. Is this intentional?

*Response: Turbines 10-13 were part of one PSD application, and Turbine 14 was part of a separate PSD application. Subsequently, all five of these turbines were part of a PSD application regarding turbine tuning events. This is why these sections are cross-referenced. I don't believe there is a better way to implement these requirements in the permit.*

4. The rule citations in Sections 2.1 J, 2.1 K, and 2.2 B.1 should be 02Q .0308(a).

*Response: I have made this change.*

5. The application review should mention all outstanding permit applications.

*Response: Section 4 of the application review now mentions the permit application .19A.*

- Erin Wallace, by email on June 15, 2020

Please add to the list of insignificant activities one 1,000 gallon diesel fuel tank for mobile equipment.

*Response: I have added this source as I-ES-47.*

DRAFT

Attachment 2 to Review of Applications 9600017.19E & .19F  
Duke Energy Progress, LLC - H.F. Lee Steam Electric Plant

**Summary of Comments on Second Draft of Permit 01812T46**

Based on responses received to the initial draft (see Attachment 1), an additional draft was sent to DEP staff on July 10, 2020. Below is a summary of responses received to this additional draft:

- Erin Wallace, by email on August 13 and August 20, 2020

1. The emergency engine FWP1 should be moved to the list of insignificant activities list.

*Response: I have made this change.*

2. Paragraph 2.2 B.1.e.ii should not require Part 75 data substitution because the applicable CEMS is not a Part 75 unit.

*Response: As an alternative, I suggested a flat substitution rate of 22.42 pounds per hour based on the annual potential emission rate in the T43 application review.*

3. Paragraph 2.2 B.1.e.ii should specify that SO<sub>2</sub> data substitution is only for demonstrating compliance with the PSD Avoidance limit.

*Response: I have made this change.*

4. Paragraph 2.2 B.1.f.i should include "(D) Daily calibration test shall be consistent with the requirements in 40 CFR Part 75, Appendix B and data validation rules contained in Part 75, Appendix B, Section 2.1.4 shall apply."

*Response: I have made this change.*

5. Some wording in Paragraph 2.2 B.1.f.ii should be corrected. In addition, this paragraph should include the sentence "In the case of a missed or failed calibration, hours will be invalidated beginning from the missed or failed calibration, moving forward until the next passed calibration."

*Response: I have made suggested corrections. However, the proposed addition is not necessary because it is covered by Paragraphs 2.2 B.1.f.i(A)-(D).*

6. Instead of 5% monitoring downtime in Paragraph 2.2 B.1.g.ii(A), use the phrase "those values as listed in the NCDAQ CEMS Enforcement Policy Manual".

*Response: Those values in the Manual are intended to establish good O&M, which is separate from demonstrating compliance with an emission limit.*

7. "Can we please include a clarification that for Units 1A, 1B, 1C the monitor downtime should be calculated using combined downtime and combined operating time for HRSG and Bypass for each unit?"

*Response: I have included this information as a footnote to the calculation for %MD.*

8. "We would like to propose an allowed 2,200 hour lookback if less than 2,200 hours operated per quarter."

*Response: I discussed this with Samir Parekh in DAQ's Stationary Source Compliance Branch, and we determined a specific number for the lookback period should not be included in the permit.*